PROXIMATE COMPOSITION AND SENSORY ANALYSIS OF AFRICAN CATFISH (*Clarias gariepinus*) HARVESTED FROM DIFFERENT SOURCES IN ONDO STATE, NIGERIA.

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ABSTRACT

Proximate composition and sensory evaluation of Africa catfish Clarias gariepinus harvested from earthen ponds, reservoir system, tank flow – through system and Flow Rivers were determined. Chemical assessment was based on the method of analysis of the Association of Official Analysis (AOAC). The samples collected shows moisture content 71.71 ±1.65%, 74.20 ± 1.39, 73.60 ± 2.3% and 72.29 ± 68% from earthen ponds, reservoirs, and tank flow- through system and rivers respectively. The crude protein 9.77±2.66%, 20.99±0.68, 19.80±0.53% and 18.84±1.00% from earthen ponds, reservoir system, tank flow- through system and rivers respectively. There was no significant difference (p>0.05) among the means recorded and the locations where the fish samples were collected has no effect on the value of the moisture and the crude protein content of the fish samples when compared. Crude fat contents 5.68±0.81%, 4.95±0.38%, 3.85±0.56% and 1.35±0.29% from reservoir system, tank flow through system, earthen ponds, and rivers respectively. Ash content of the fish samples were 1.52±0.40%, 1.49±0.40%, 2.23±0.91% and 1.47±0.60% from earthen ponds, reservoir system, tank flow- through system and rivers respectively. There was a significant difference (p <0.05) among the means of the crude fat contents and ash contents. The location where the fish samples were collected influenced the means of the ash content and the crude fat contents. The taste, odour, appearance and texture were the indices for the evaluation. Fish from rivers were most preferred followed by earthen ponds, reservoirs system and tank flow- through system respectively

KEYWORDS *Reservoir, Tank flow-through, River, Earthen pond.*

INTRODUCTION

The African catfish, *C. gariepinus* is easily cultured in Nigeria and of great economic interest. It is generally considered to be one of the most important tropical catfish species for aquaculture (Osibona et al. 2006). It is found throughout Africa from the Nile to West Africa and from Algeria North African to South Africa. Its culturing is enhanced by its ability to survive a wide range of water conditions high market price, hardness, resistance to disease and high yield of potentials (Ezenwa, 1994).

There are various reasons for the merits of cat fish. Fish provides adequate protein, lipids, minerals and vitamins for humans. Fish proteins occur in high concentration and posses an excellent amino acid balance. According to Eyo (2001), the lysine content of fish is higher than that of meat, milk and eggs. Fish lipids differ from animal and vegetable oils because their fatty acids are characteristically long chained and highly unsaturated and thus according to (Borgstorn, 1984), help to reduce the cholesterol content of blood. Fish also contains appreciable quantity of vitamins which are necessary for the maintenance of good health. They are highly digestible and less tough compared to beef, mutton, chicken and bush meat (Eyo, 2000).

Various studies have been carried out on the proximate, chemical composition and sensory evaluation of different fish species (Eun et al, (1994), Osibona et al. (2006), Eyo, (1998)). However, there is limited knowledge on proximate composition of fish species from Nigerian water. Thus, this study aimed at evaluating the proximate composition and sensory characteristics of *C. gariepinus* harvested from different sources in Ondo state.

MATERIALS AND METHODS

The fresh fish *C.gariepinus* used for this study were obtained from ten different locations in Ondo State, 32 fishes of average weight of 500g were selected. The fishes were transported to laboratory in sixteen cylindrical plastic buckets for analysis. The methods for analysis were the standard procedure of (AOAC, 1990). Crude protein was determined by (Nx6.25) kjeldahl distillation method. The fish samples used for sensory evaluation were subjected to boiling, oven drying and smoking. Samples subjected to boiling were steamed for 7 minutes at 100°C. Samples were oven dried for 20 minutes at 100°C. Samples were smoked in a traditional smoking kiln; the physical parameters assessed by the judges were texture, appearance, odour and taste.

STATISTICAL ANALYSIS

Data collected from each source was subjected to analysis of variance (ANOVA) test. Mean separation was done where there was significant difference using Duncan Multiple Range test at $p<0.05$

RESULTS AND DISCUSSION

PROXIMATE COMPOSITION

The proximate composition of the analyzed samples collected from earthen ponds, reservoirs, tank flow through system and rivers respectively is shown in table 1 and figure 1. The species investigated in this study *C. gariepinus* is the popular market fish in rural and urban areas of Ondo State. The proximate composition of the fish sample showed moisture contents that ranged between 71.71±1.65 and 74.20±1.39. This moisture content was within previously reported range in other fishes (Osibona et *al.*, 2006). Usually, moisture and lipid contents in fish fillets are inversely related and their sum is approximately 80 percent (FAO, 1999). Percentage moisture in the muscle was within the acceptable levels of 30% - 80% Eyo, (2001). The proximate composition of the fish samples revealed crude protein contents ranges from 18.84±1.00% to 20.99±0.68%. The concentrations of the protein content were within the range previously reported for *C. gariepinus* and other fishes (Murray and Burt, 1977; Afolabi *et al.*, 1984; Eyo, 2001 and Osibona *et al.*, 2006, Onyia *et al.*, 2007). The relatively high to moderate percentage crude protein may be attributed to the fact that fishes are good sources of pure protein, but the differences observed in values obtained could also be as a result of fish consumption or absorption capability and conversion potentials of essential nutrients from their diets or their local environment into such biochemical attributes needed by the organism (Adewoye and Omotosho, 1997). The result showed that the lipid content fall within the range of 1.35±0.27 to 5.68±0.81. This is within the range reported for fish (Mendez *et al.*, 1996). The low concentration of lipid in the muscles of this species could be due to the use of fat reserves during spawning activities. Eyo (2001) reported that, as the water content rise in a fish the fat falls; vice versa. A high fat content is usually indicative of a high eating and processing quality. The lipid level in the fish tissue could have been due to the influence of food (Onyia *et al.*, 2007). The significant difference ($P<0.05$) in the lipid of the fish from the different sources could be due to the metabolic and physical activities of the fish.

ORGANOLEPTIC EVALUATION

The organoleptic scores for appearance, texture, odour and taste of boiled samples were presented in table 2, 3, & 4. Organoleptic scores for boiled samples from the rivers were mostly preferred by the panelist followed by the samples from the reservoirs, earthen pond and the least preferred were samples from tank flow through system. Organoleptic scores for oven dried samples presented in table 3 shows that samples from rivers were most acceptable by the panelist followed by samples from the earthen pond, reservoir and tank flow through system. Organoleptic scores for smoked samples shown in table 4. Samples from earthen ponds were mostly preferred by the panelist, followed by the samples from the reservoir tank flow through system and river respectively.

Table 1: Proximate Composition of fresh *C. gariepinus* from different sources in Ondo State, Nigeria.

Composition (%)	Earthen Pond	Reservoir	Tank Flow-Through	Rivers
Moisture	71.71±1.65a	74.20±1.39a	73.60±2.37a	72.29±0.68a
Crude Protein	19.77±2.66a	20.99±0.68a	19.80±0.53a	18.84±1.00a
Crude Fat	3.85±0.5c	5.68±0.81a	4.95±0.38b	1.35±0.29d
Ash	1.52±0.40b	1.49±0.40b	2.23±0.91a	1.47±0.60b

Value = Means of triplicate. Values with the same letter across the rows are not significantly different (P>0.0

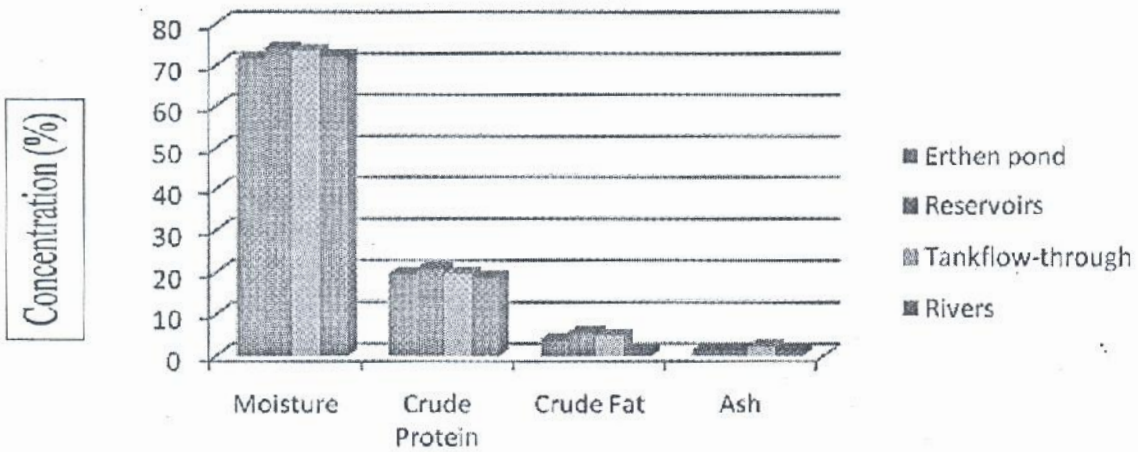

Figure 1: concentration of moisture, crude protein, crude fat and ash of *C. gariepinus* from different sources in Ondo State.

TABLE 2: Organoleptic Score for boiled samples of *C. gariepin us*

	APPEARANCE		TEXTURE		ODOUR		TASTE	
	B.C	D.C	T	F	P	N.P	G	B
Earthen Pond	8	2	6	4	10	-	8	2
Reservoir	8	2	4	6	10	-	9	1
Tank flow - through	7	3	5	5	9	1	10	-
River	10	0	1	9	10	-	10	-

B.C= Bright Colour, D.C= Dull Colour, T= Tenderness, F= Firmness, P= Pleasant, N.P= Not Pleasant, G= Good, B= Bad.

TABLE 3: Organoleptic Score for oven dried samples of *C. gariepinus*

	APPEARANCE		TEXTURE		ODOUR		TASTE	
	B.C	D.C	T	F	P	N.P	G	B
Earthen Pond	8	2	3	7	10	-	9	1
Reservoir	9	1	4	6	9	1	8	2
Tank flow - through	8	2	5	5	8	2	9	1
River	9	1	2	8	10	-	10	-

B.C= Bright Colour, D.C= Dull Colour, T= Tenderness, F= Firmness, P= Pleasant, N.P= Not Pleasant, G= Good, B= Bad.

TABLE 4: Organoleptic Score for smoked samples of *C. gariepinus*

	APPEARANCE		TEXTURE		ODOUR		TASTE	
	B.C	D.C	T	F	P	N.P	G	B
Earthen Pond	10	-	8	2	10	-	10	-
Reservoir	9	1	5	5	10	-	10	-
Tank flow through	8	2	7	3	8	2	9	1
River	10	-	6	4	4	6	10	-

B.C= Bright Colour, D.C= Dull Colour, T= Tenderness, F= Firmness, P= Pleasant, N.P= Not Pleasant, G= Good, B= Bad.

CONCLUSION

The changes observed in the chemical parameters assessed in this study might be due to the differences in environment, nutritional and rearing conditions that they were subjected to. According to Kinsella (1988), fish quality is a very difficulty concept to explain due to variety of factors that must be considered. Quality of fish involves nutritional, microbiological and sensorial attributes of fish products as perceived by the consumers. The observed range of protein and ash content of the fish indicated that the species is a good source of protein and minerals such as Calcium, Potassium, Zinc, Iron and Magnesium. The smoked fishes are more acceptable than those subjected to other processing methods (boiled and oven-dried) probably the effect of smoked has improved the flavor and texture of the fish and make it palatable to the panels.

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